

CLAIMS

1. A mobile node comprising:

a measuring section for measuring at least one of a hop number and communication delay time to a home agent;

5 a home agent information acquiring section for acquiring information about a home agent as a subject of measurement of the measuring section; and

a home agent selecting section for changing, when a measurement value to the home agent to which the mobile node belongs becomes equal to or greater than a first predetermined value, the belonging home agent into the new home agent, by using the information which acquired in the acquiring section, having a measurement value equal to or less than a second predetermined value.

15 2. A mobile node according to claim 1, wherein, in a case that the mobile node is in real-time communication with another node, the measuring section measures a communication delay time to the home agent to change, when a communication delay to the belonging home agent becomes equal to or greater than a third predetermined value, the belonging home agent by one having a communication delay equal to or smaller than a fourth predetermined value;

and in the case of not so, the measuring section measures a hop number to the home agent to change, when a hop number to the belonging home agent becomes equal to or greater than a first predetermined value, the belonging home agent by one having a hop

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number equal to or smaller than a second predetermined value.

3. A mobile node according to claims 1, wherein the measuring section determines the hop number by computing a difference between an initial value of a hop limit field in a header
5 of a packet of IP version 6 sent from the home agent and a value of the hop limit field received.

4. A mobile node according to claims 2, wherein the measuring section determines the hop number by computing a difference between an initial value of a hop limit field in a header
10 of a packet of IP version 6 sent from the home agent and a value of the hop limit field received.

5. A mobile node according to claims 1, wherein the measuring section determines the communication delay time by measuring a time of from sending the home agent an ICMP echo request
15 packet to receiving an ICMP echo reply packet from the home agent.

6. A mobile node according to claims 2, wherein the measuring section determines the communication delay time by measuring a time of from sending the home agent an ICMP echo request packet to receiving an ICMP echo reply packet from the home agent.

20 7. A mobile node according to claim 1, wherein the measuring section increases a measuring frequency of communication delay time when the moving speed of the mobile node is high, and decreases the measuring frequency when the moving speed is low.

8. A mobile node according to claim 3, wherein the measuring
25 section sends an ICMP echo request packet when the number of times of connection changes to the access router becomes an integer

times a fifth predetermined value.

9. A home agent comprising: a home agent information notifying section for answering a registration refusal in a case that, when receiving a registration request from a mobile node,
5 the home agent is deficient in unoccupied resource.

10. A home agent according to claim 9, further comprising a home agent information storing section for storing home agent information including an address and current resource information of another home agent, wherein the home agent information
10 notifying section answers the registration refusal and selects a home agent suited for a predetermined condition from the home agent information storing section to thereby answer home agent information of the selected home agent.

11. A home agent according to claim 10, wherein the
15 predetermined condition is at least any of a maximum in unoccupied resource and a minimum in load.

12. A home agent comprising: a home agent information notifying section for answering a registration refusal in a case that, when received a registration request from a mobile node,
20 the mobile node entered a predetermined sub-network.

13. A home agent according to claim 12, further comprising a home agent information storing section for storing home agent information including an address of another home agent, wherein the home agent information notifying section answers the
25 registration refusal and selects a home agent having as a control range the sub-network to thereby answer home agent information

of the selected home agent.

14. A home agent according to claims 11, wherein the registration refusal and the home agent information are an addition of a home agent information option to a binding
5 acknowledgement message.

15. A home agent comprising: a home agent information notifying section for notifying, when receiving a notification for changing a home agent and an address of a changed-to home agent from a belonging mobile node, the changed-to home agent of an entry
10 content concerning the mobile node of a binding cache.

16. An access router comprising:

a home agent information storing section for storing home agent information including an address of a home agent; and

a home agent information notifying section for notifying
15 a mobile node, as a slave, of home agent information about a neighboring home agent stored in the home agent information storing section.

17. An access router according to claim 16, wherein the home agent information notifying section notifies the mobile node of
20 home agent information when requested from the mobile node.

18. An access router according to claim 16, wherein the home agent information notifying section periodically notifies the mobile node of home agent information.

19. A home agent information storing server comprising:

25 a home agent information storing section for holding home agent information including an address of a managing home agent;

a home agent information notifying section for notifying any one of a mobile node, access router and home agent in connection to a network of the home agent information selected from the home agent information storing section.

5 20. A home agent information storing server according to claim 19, wherein the home agent information storing section further holds any one piece of information of current unoccupied resource and load of the managing home agent.

10 21. A home agent information storing server according to claim 20, further comprising a home agent information acquiring section for receiving the information from the managing home agent and updating the home agent information storing section.

15 22. A home agent according to claims 10, further comprising a home agent information acquiring section for acquiring the home agent information from the home agent information storing server comprising:

a home agent information storing section for holding home agent information including an address of a managing home agent; and

20 a home agent information notifying section for notifying any one of a mobile node, access router and home agent in connection to a network of the home agent information selected from the home agent information storing section;

25 wherein the home agent information storing section further holds any one piece of information of current unoccupied resource and load of the managing home agent.

23. A home agent according to claim 22, characterized to send information of own load and unoccupied resource to the home agent information storing server:

a home agent information storing section for holding home agent information including an address of a managing home agent;
5 and

a home agent information notifying section for notifying any one of a mobile node, access router and home agent in connection to a network of the home agent information selected from the home agent information storing section;
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wherein the home agent information storing section further holds any one piece of information of current unoccupied resource and load of the managing home agent.

24. An access router according to claim 16, further comprising a home agent information acquiring section for getting the home agent information from the home agent information storing server:
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a home agent information storing section for holding home agent information including an address of a managing home agent;
20 and

a home agent information notifying section for notifying any one of a mobile node, access router and home agent in connection to a network of the home agent information selected from the home agent information storing section;

25 wherein the home agent information storing section further holds any one piece of information of current unoccupied resource

and load of the managing home agent.

25. A mobile node according to claim 1, wherein the home agent information acquiring section gets the home agent information from the home agent information storing server:

5 a home agent information storing section for holding home agent information including an address of a managing home agent; and

10 a home agent information notifying section for notifying any one of a mobile node, access router and home agent in connection to a network of the home agent information selected from the home agent information storing section;

wherein the home agent information storing section further holds any one piece of information of current unoccupied resource and load of the managing home agent.

15 26. A mobile node according to claim 1, wherein the home agent information acquiring section gets information about a home agent notified from the home agent comprising:

20 a home agent information notifying section for answering a registration refusal in a case that, when receiving a registration request from a mobile node, the home agent is deficient in unoccupied resource; and

 a home agent information storing section for storing home agent information including an address and current resource information of another home agent;

25 wherein the home agent information notifying section answers the registration refusal and selects a home agent suited

for a predetermined condition from the home agent information storing section to thereby answer home agent information of the selected home agent.

27. A mobile node according to claim 26, wherein the home agent selecting section selects, preferentially, a home agent satisfying at least any of conditions of greatest unoccupied resource, minimum load, least hop number and shortest communication delay time.

28. A method for mobile communications comprising:
10 a step of measuring at least any one of a hop number and communication delay time to a belonging home agent by a mobile node;

a step of requesting a belonging home agent to delete registration and a new home agent to make registration, when a
15 result of measurement becomes equal to or greater than a predetermined value;

a step of deleting a registration of the mobile node by the belonging home agent; and

a step of registering the mobile node by the new home agent.

20 29. A method for mobile communications according to claim 28, wherein as the new home agent is selected preferentially a home agent satisfying at least any of conditions of greatest unoccupied resource, minimum load, least hop number and shortest communication delay time.

25 30. A method for mobile communications according to claim 29, wherein the new home agent is notified from a home agent

information managing server for managing information about home agents to the mobile node.